Vince Bayou August 31, 2017 Aerial Photograph Expert Interpretation

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9/27/2017

Introduction

Aero-Data was asked to review the article by Associated Press entitled, “Evidence of Spills at Toxic Site During Floods” and comment on the language and interpretations of the 8/31/2017 aerial photography taken by the National Oceanic and Atmospheric Administration (NOAA). It is not uncommon for persons unfamiliar with interpreting aerial photography to draw erroneous conclusions when reviewing a photograph taken on a single date.

Aero-Data has downloaded the 8/31/2017 imagery (Figure 1) from the NOAA for the areas around the U.S. Oil Recovery site and confluence of Vince Bayou and Houston Ship Channel. Typical aerial photomissions are taken on cloud free days. This 8/31/2017 imagery was taken under less than ideal conditions to document flooding in Texas and cloud shadows are present. The metadata provided by NOAA states that in an effort to acquire imagery in a timely manner after the event, clouds may be present in the imagery.

In addition, I have also reviewed a USGS map of the area (Figure 2), the 9/15/2008 imagery (Figure 3) from the NOAA which was taken after Hurricane Ike and the 10/22/2016 imagery (Figure 4) from USDA.

Specifically, I will respond to the language in the article which states:

- *The U.S. government received reports of three spills at one of Houston's dirtiest Superfund toxic waste sites in the days after the drenching rains from Hurricane Harvey finally stopped. Aerial photos reviewed by The Associated Press show dark-colored water surrounding the site as the floods receded, flowing through Vince Bayou and into the city's ship channel.*
- *Photos taken Aug. 31 by the National Oceanic and Atmospheric Administration shows dark-colored water surrounding the site two days after the first spill was reported to the government hotline. While the photos do not prove contaminated materials leaked from U.S. Oil Recovery, they do show that as the murky floodwaters receded, they flowed through Vince Bayou and emptied into the ship channel leading to the San Jacinto River. The hotline caller identified Vince Bayou as the waterway affected by a spill of unknown material in unknown amounts.*
- *Thomas Voltaggio, a retired EPA official who oversaw Superfund cleanups and emergency responses for more than two decades, reviewed the aerial photos, hotline reports and other documents obtained by AP.*
- *“It is intuitively obvious that the rains and floods of the magnitude that occurred during Hurricane Harvey would have resulted in some level of contamination having been released to the environment," said Voltaggio, who is now a private consultant. "Any contamination in those tanks would likely have entered Vince Bayou and potentially the Houston Ship Channel."*

Aero-Data Corporation’s Observations and Conclusions

Dark-colored water is not necessarily indicative of contamination. In this case, Vince Bayou flowing into the ship channel is not evidence of contamination transport. The water within the ship channel is turbid, likely due to the sediment from the receding floodwaters. The water flowing from Vince Bayou is not as turbid and therefore, appears darker. Also the location of the confluence of Vince Bayou and the Houston Ship Channel is within a cloud shadow on the 8/31/2017 aerial imagery which makes the area appear even darker. (Figure 5)

The same dark-colored water signature is visible on several other bayous in the area. Sim's Bayou and Bray's Bayou also have a darker color due to turbidity variations in the bayous and streams compared to the ship channel. Also, cloud shadows are notable throughout the 8/31/2017 imagery. (Figure 6)

In addition, similar areas of non-turbid water entering into a body of turbid water are visible 8 miles to the northwest at the confluence of Little Whiteoak Bayou into Whiteoak Bayou and Whiteoak Bayou into Buffalo Bayou. (Figure 7)

The 9/15/2008 imagery from Hurricane Ike was also reviewed and shows the same pattern of less turbid water flowing from the bayous into a more turbid ship channel. An image has been created to show the Hurricane Ike 9/15/2008 imagery, the 10/22/2016 USDA NAIP imagery (non-storm imagery) and Hurricane Harvey 8/31/2017 imagery. (Figure 8)

8/31/2017
Pasadena, TX
Photo Source: NOAA

FIGURE 1

N
W E
S

750 0 750 1500 Feet

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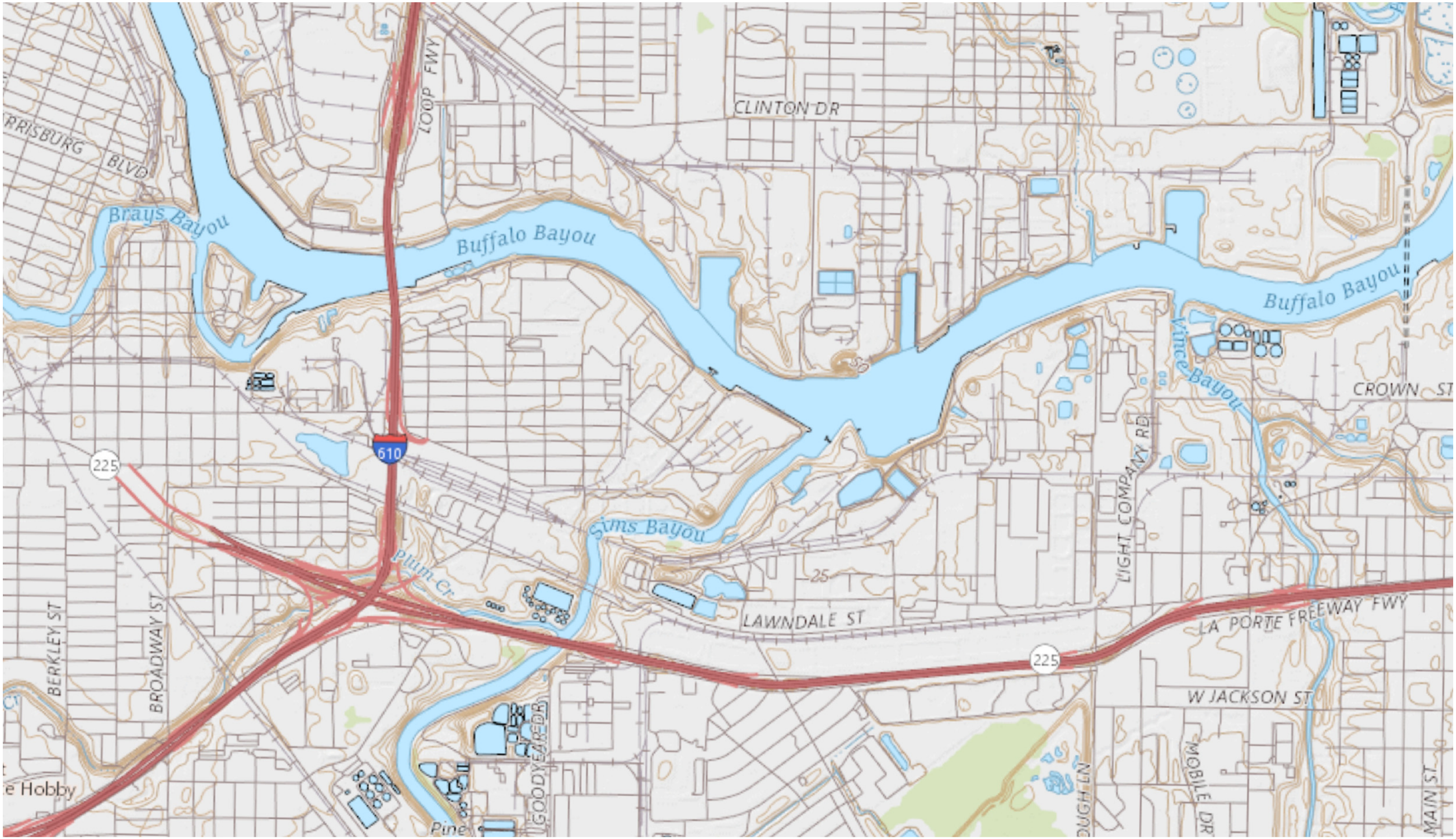

Map
Pasadena, TX **FIGURE 2**

Map Source: USGS The National Map

USGS The National Map: National Boundaries Dataset, 3D Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; U.S. Census Bureau - TIGER/Line

N W E S

750 0 750 1500 Feet

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9/15/2008
Pasadena, TX
Photo Source: NOAA

FIGURE 3

N
W E
S

750 0 750 1500 Feet

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10/22/2016
Pasadena, TX

FIGURE 4

Photo Source: USDA-NAIP

N
W E
S

750 0 750 1500 Feet

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Pasadena, TX
Photo Source: NOAA

FIGURE 5

N
W E
S

375 0 375 750 Feet

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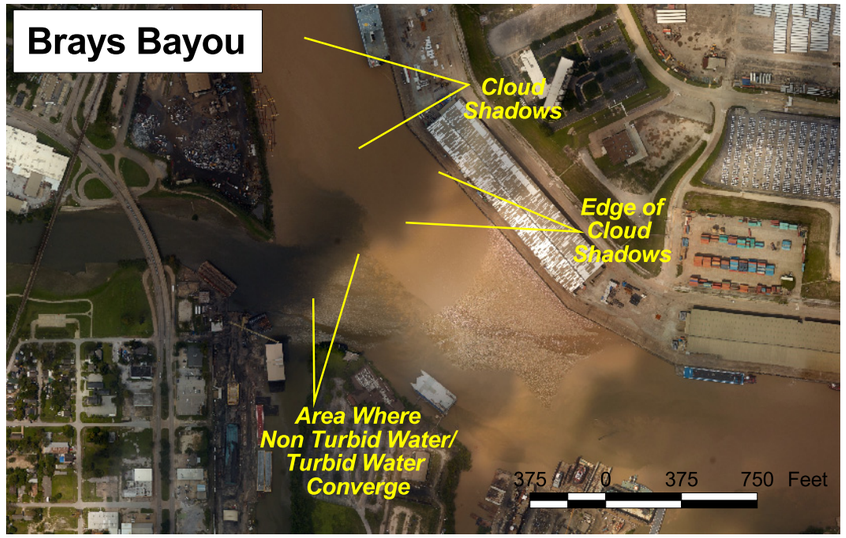

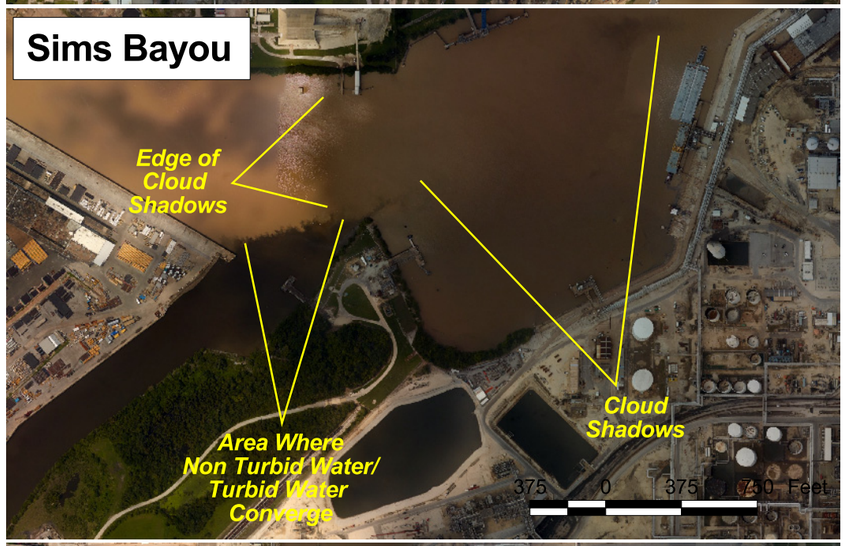

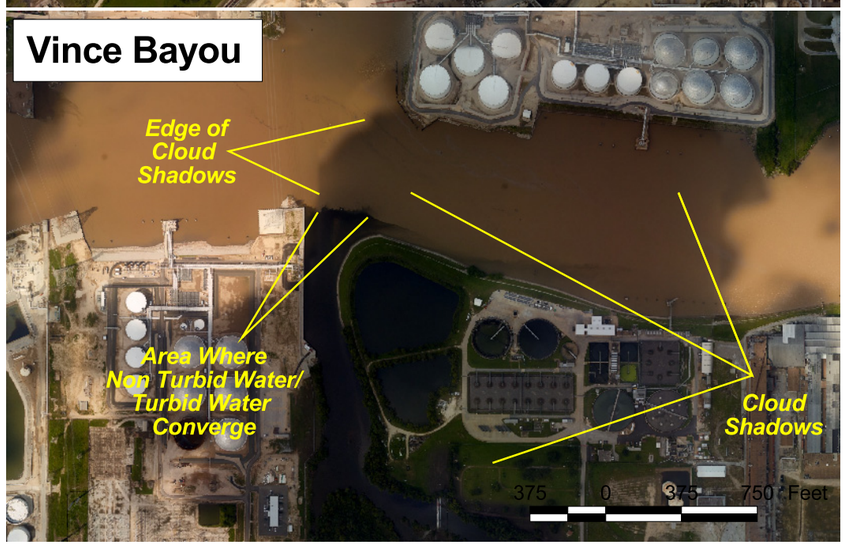

8/31/2017
Pasadena, TX
Photo Source: NOAA

FIGURE 6

N W E S

1000 0 1000 2000 Feet

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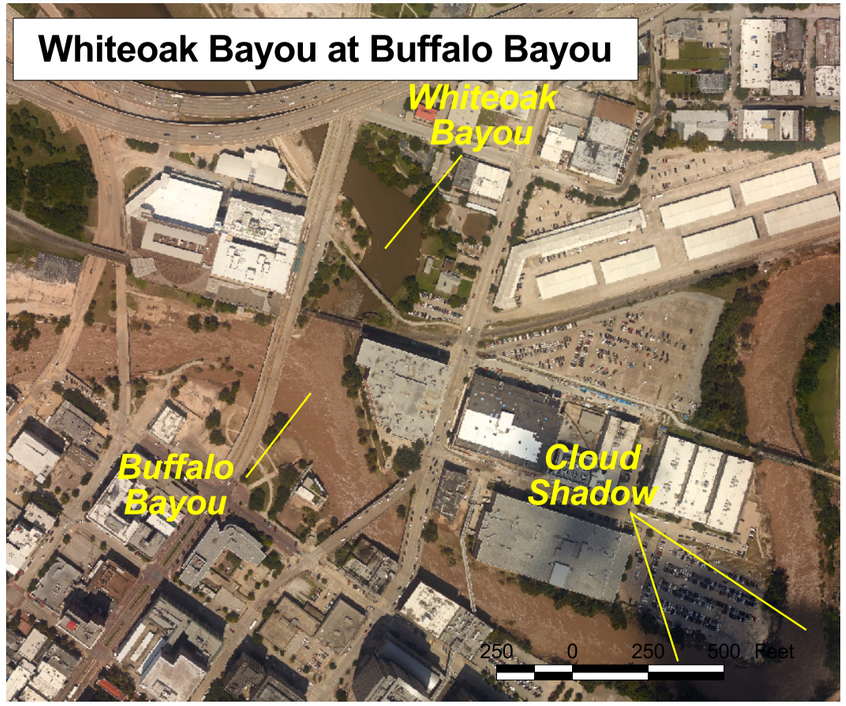

8/31/2017
Pasadena, TX
Photo Source: NOAA

FIGURE 7

8/31/2017 Images overlaid onto the USGS The National Map

USGS The National Map: National Boundaries Dataset, 3D Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; U.S. Census Bureau - TIGER/Line

N W E S

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9/15/2008
Photo Source: NOAA

10/22/2016
Photo Source: USDA-NAIP

8/31/2017
Photo Source: NOAA

Vince Bayou
Pasadena, TX

FIGURE 8

Confluence of Vince Bayou and Buffalo Bayou/Houston Ship Channel

N W E S

250 0 250 500 Feet

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